UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
CHEN, PO WEI

ART UNIT	PAPER NUMBER
2676	

DATE MAILED: 05/16/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM ·
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _13 December 2004_.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
      closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-41_ is/are pending in the application.

      4a) Of the above claim(s) _20,21,26 and 27_ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-19, 22-25 and 28-41_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

      Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

      Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

      a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage

          application from the International Bureau (PCT Rule 17.2(a)).

      * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
      Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
      Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

In response to an Amendment received on December 13, 2004. This action is final.

Claims 1-41 are pending in this application. Claims 1, 22, 28, 31, 33-39 are independent claims.

Claims 20-21 and 26-27 are withdrawn from consideration.

The present title of the invention is "Dynamically Adjusted Brush For Direct Paint Systems on

Parameterized Multi-Dimensional Surfaces".

Election/Restrictions

1.   This application contains claims 20-21 and 26-27 drawn to an invention nonelected

without traverse in an Office Action mailed on July 29, 2003. A complete reply to the final

rejection must include cancellation of nonelected claims or other appropriate action (37

CFR 1.144) See MPEP § 821.01.

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3.   Claims 1-4, 9, 11-12, 14, 28, 31, 34-35 and 38-41 are rejected under 35 U.S.C. 102(e) as

being anticipated by Hanrahan et al. ("Direct WYSIWYG Painting and Texturing on 3D

Shapes", Computer Graphics, Vol. 24, No. 4, August 1990, pp. 215-223).

4.   Regarding claim 1, Hanrahan discloses a method for Direct WYSIWYG Painting on 3D

shapes comprising:

Selecting an area of a displayed parametric object living in three dimensional or higher

space; painting a tangent space brush directly onto a surface of the area of the displayed

parametric object in the three dimensional or higher space (pp 4 of page 216, pp 6 of page 219).

5.   Regarding claim 2, Hanrahan discloses a method for Direct WYSIWYG Painting on 3D

shapes comprising:

The painting is performed view independently (pp 4 of page 216 and pp 2-3 of page 219;

it is noted that painting can be done on any viewing angle).

6.   Regarding claim 3, Hanrahan discloses a method for Direct WYSIWYG Painting on 3D

shapes comprising:

7.   The painting first aligns the brush to a normal vector of the surface (pp 4 of page 219; it

is noted that the tangent space brush is applied in alignment with the normal vector of the

surface).

8.   Regarding claim 4, Hanrahan discloses a method for Direct WYSIWYG Painting on 3D

shapes comprising:

The painting is performed without first painting the brush on a two dimensional texture

space corresponding to the object (pp 4 of page 216; painting is done directly on the 3D shape

object).

9.   Regarding claims 9 and 11-12, Hanrahan discloses a method for Direct WYSIWYG

Painting on 3D shapes comprising:

Computing a tangent plane by computing a normal vector at an intersection point where

the brush is applied; and projecting the brush on the surface of the selected area using the tangent

plane; the brush is two dimensional; the brush is three dimensional (pp 6 of page 219).

10.   Regarding claim 14, Hanrahan discloses a method for Direct WYSIWYG Painting on 3D

shapes comprising:

An intensity of portions of a brush painting varies based on a normal vector of respective

portions of the surface (pp 5 of page 220 and pp 1 of page 221).

11.   Regarding claim 28, as statements presented above, with respect to claims 1 and 9 above

are incorporated herein.

12.   Regarding claim 31, Hanrahan discloses a method for Direct WYSIWYG Painting on 3D

shapes comprising:

Defining a series of points on the parameterized object representing a stroke; positioning

and orienting a brush stamp for each point in the series of points in a view independent manner

(pp 2-4 of page 218);

Directly painting the stroke into an object texture as a collection of texture modifications

using the brush stamp for each point on the parameterized object in the three dimensional or

higher space (pp 4 of page 216 and pp 2-3 of page 220).

13.   Regarding claims 34-35 and 38-41, statements presented above, with respect to claim 1

are incorporated herein.

Claim Rejections - 35 USC § 103

14.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

15.   Claims 5-7, 13, 15-16, 17-19, 29 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Hanrahan et al. ("Direct WYSIWYG Painting and Texturing on 3D Shapes",

Computer Graphics, Vol. 24, No. 4, August 1990, pp. 215-223) as applied to claims 1 and 28

above, and further in view of Daniels et al. (US 6,268,865; refer to as Daniels herein).

16.   Regarding claims 5-6, Hanrahan does not disclose converting a selected two dimensional

screen coordinate into a three dimensional world coordinate; identifying an intersection point by

intersecting a vector comprising the three dimensional world coordinate and a viewing direction,

and the object. Daniels discloses a method for three-dimensional painting utilizing the process

(lines 30-35 of column 12 and 28-35 of column 13 and Fig. 9).

It would have been obvious to one of ordinary skill in the art to utilize the method

of determining painting position of Daniels to provide a smooth process of applying paint on 3D

surface such as one disclosed by Hanrahan.

17.   Regarding claim 7, Hanrahan discloses a method for Direct WYSIWYG Painting on 3D

shapes comprising:

Computing a tangent plane by computing a normal vector at the intersection point; and

projecting the brush on the three dimensional surface of the selected area using the tangent plane

(pp 6 of page 219).

18.   Regarding claims 13 and 15-16, Hanrahan does not disclose the brush is cylindrical with

a defined depth; the painting stops beyond a portion of the surface with a normal vector which

varies more than a predetermined angle from an intersection point normal and the predetermined

angle is 90 degrees. Daniels discloses a method for three-dimensional painting utilizing the

process (lines 53-62 of column 2, lines 16-19 of column 3 and lines 46-59 of column 15 and Fig.

15). It is noted that the painting corresponds to stroke width. And the width will be limited to a

maximum size when normal vector is normal (or 90 degrees) to P, the view point intersection on

the surface.

It would have been obvious to one of ordinary skill in the art to utilize the brush

and the painting method of Daniels to provide a smooth process of applying paint

on 3D surface such as one disclosed by Hanrahan.

19.   Regarding claims 17-19, Hanarahan does not disclose the painting stops beyond a portion

of the surface when a distance from the brush to the portion of the surface is greater than a

predetermined threshold; before the painting, the brush is rotated in a brush stroke direction;

before the painting, a brush resolution for the brush is determined and applied. Daniels discloses

a method for three-dimensional painting utilizing the process (lines 33-43 of column 8, lines 5-9

of column 9 and Fig. 4, and lines 34-41 of column 20). It is noted that the brush width

corresponds to painting and it stops when the normal distance is greater than certain threshold

depending on the size of brush chose.

It would have been obvious to one of ordinary skill in the art to utilize the brush

and the painting method of Daniels to provide a smooth process of applying paint

on 3D surface such as one disclosed by Hanrahan.

20.   Regarding claim 29, Hanrahan does not disclose determining a normal to the surface at

the point; determining a radius and a depth of the brush in a plane tangent to the surface at the

point; bringing the brush and the surface into coincidence along the normal; determining portions

of the object intersected by the brush using the depth and the radius; applying paint to

corresponding portions of object texture in texture space; and applying texture to the object.

Daniels discloses a method for three-dimensional painting utilizing the process:

Determining a normal to the surface at the point (lines 43-45 of column 15 and Fig. 15);

Determining a radius and a depth of the brush in a plane tangent to the surface at the

point (lines 46-59 of column 15 and lines 43-67 of column 20 and lines 1-12 of column 21 and

Fig. 15). While claim recites radius, by determining the width of the brush, will also determines

the radius of the brush. The depth is determined depending on the focus and amount of emphasis

given to the point;

Bringing the brush and the surface into coincidence along the normal (lines 28-36 of

column 13 and lines 46-59 of column 15 and Fig. 9 and 15). It is noted the brush width data is

being determined and mapped on the surface normal point;

Determining portions of the object intersected by the brush using the depth and the radius

(lines 46-59 of column 15 and lines 43-67 of column 20 and lines 1-12 of column 21 and Fig.

15). The width of the brush corresponds to the portion of the object intersected by the brush and

depending on the focus and amount of emphasis, different width is computed;

Applying paint to corresponding portions of object texture in texture space (lines 19-29

of column 12 and lines 28-36 of column 13). The brush data is being mapped on to the object

surface which contains surface map information that corresponds to texture;

While Daniels does not disclose applying the texture to the object in the invention, the method is

disclosed in the background information (lines 55-62 of column 1).

It would have been obvious to one of ordinary skill in the art to utilize the brush

and the painting method of Daniels to provide a smooth process of applying paint

on 3D surface such as one disclosed by Hanrahan.

21.   Regarding claim 32, Hanrahan does not disclose a compiling images produced by the

painting into a movie. Daniels discloses a method for three-dimensional painting utilizing the

process lines 1-2 of abstract).

22.   It would have been obvious to one of ordinary skill in the art to utilize the movie image

process of Daniels to provide the advantage of utilizing 3D painting method disclose by

Hanrahan to provide a better image process in movie prodution.

23.   Claims 22-24, 33 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Hanrahan et al. ("Direct WYSIWYG Painting and Texturing on 3D Shapes", Computer

Graphics, Vol. 24, No. 4, August 1990, pp. 215-223) in view of Daniels et al. (US 6,268,865;

refer to as Daniels herein).

24.   Regarding claims 22-24, statements presented above with respect to claim 1 are

incorporated herein. Hanrahan does not disclose reverse projecting texture from a surface of the

selected area onto a temporary brush, processing the temporary brush using a selected process;

the selected process uses a particular filter; the selected process uses a particular brush. Daniels

discloses a method for three-dimensional painting utilizing the process (lines 21-24 of column 6

and lines 19-43 of column 12 and Fig. 9; the saved stroke data corresponds to temporary brush

which is mapped to the surface of the selected view that contains surface map information that

corresponds to texture).

It would have been obvious to one of ordinary skill in the art to utilize the brush

and the painting method of Daniels to provide a smooth process of applying paint on 3D surface

such as one disclosed by Hanrahan.

25.   Regarding claim 33, statements presented above, with respect to claims 1 and 32 are incorporated herein.

26.   Regarding claim 37, statements presented above, with respect to claims 1 and 19 are incorporated herein.

27.   Claims 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hanrahan et al. ("Direct WYSIWYG Painting and Texturing on 3D Shapes", Computer Graphics, Vol. 24, No. 4, August 1990, pp. 215-223) as applied to claim 1 above, and further in view of Morioka et al. (US 6,239,809; refer to as Morioka herein).

28.   Regarding claims 8 and 10, Hanrahan does not disclose interpolated normal vector. However, this is known in the art taught by Morioka. Morioka teaches a image processing comprising a interpolated normal vector (lines 28-31 of column 12). It would have been obvious to one of ordinary skill in the art at time of invention to utilize the teaching of Morioka to provide a more efficient image processing (lines 17-21 of column 2, Morioka). Also, Hanrahan and Morioka are directed to image processing in three-dimensional space.

29.   Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanrahan et al. ("Direct WYSIWYG Painting and Texturing on 3D Shapes", Computer Graphics, Vol. 24, No. 4, August 1990, pp. 215-223) and Daniels et al. (US 6,268,865; refer to as Daniels herein), as applied to claim 28 above, and further in view of Morioka et al. (US 6,239,809; refer to as Morioka herein).

30.   Regarding claim 30, statements presented above, with respect to claim 8 are incorporated herein.

31.   Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanrahan et al.

("Direct WYSIWYG Painting and Texturing on 3D Shapes", Computer Graphics, Vol. 24, No.

4, August 1990, pp. 215-223) and Daniels et al. (US 6,268,865; refer to as Daniels herein), as

applied to claim 22 above, and further in view of Bossut (US 6,239,807).

32.   Regarding claim 25, the combination of Hanrahan and Daniels does not disclose the

particular brush is selected based on a determination of an appropriate brush resolution.

However, this is known in the art taught by Bossut. Bossut teaches a method for multi-resolution

texture mapping that "offers the user the capability of touching up coarse details at one

resolution, and fine details at a magnified resolution" (lines 49-60 of column 6). It would have

been obvious to one of ordinary skill in the art at time of invention to utilize the teaching of

Bossut to provide the advantage of allowing user to choose the appropriate resolution for

painting the image.

33.   Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hanrahan et al.

("Direct WYSIWYG Painting and Texturing on 3D Shapes", Computer Graphics, Vol. 24, No.

4, August 1990, pp. 215-223), and further in view of Daniels et al. (US 6,268,865; refer to as

Daniels herein) and Morioka et al. (US 6,239,809; refer to as Morioka herein).

34.   Regarding claim 36, as statements presented above, with respect to claims 1-8, 14, 15 and

17 are incorporated herein.

Response to Arguments

35.   Applicant's arguments filed December 13, 2004 have been fully considered but they are

not persuasive.

Applicant argues that Hanrahan does not implement the method of utilizing tangent space

brush painting. However, Hanrahan discloses that three different brushes can be used for painting objects in 3D (pp 6 of page 219). Applicant further argues that Hanrahan does not disclose how to solve the difficulties associated with approximation. However, the claim broadly discloses "painting a tangent space brush directly onto a surface", and does not disclose specific limitation on the approximation issue. Hanrahan disclose that "A tangent space brush is mapped onto the surface by first placing the brush in the plane tangent to the surface at the brush position, and then projecting the brush onto the surface in the direction parallel to the normal" (pp6 of page 219). While Hanrahan does not disclose specific ways to improve the approximation, it is clear that Hanrahan discloses a tangent space brush can be used for painting objects in 3D space. Thus the limitation is met.

Conclusion

36.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Po-Wei (Dennis) Chen whose telephone number is (703) 305-8365. The examiner can normally be reached on 9am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew C Bella can be reached on (703) 308-6829. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

Po-Wei (Dennis) Chen
Examiner
Art Unit 2676

Po-Wei (Dennis) Chen
May 4, 2005

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